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represent the dim bands of the resting muscle, while the singly refracting light bands of the resting muscle disappear completely during maximal tetanus, being absorbed apparently by the doubly refracting substance of the dim band. When the tetanus was not maximal some of the singly refracting substance was still found in the contracted fiber.

The results given go to support Englemann's theory of muscle contraction, according to which the shortening of the contracted fiber is owing to the absorption by imbibition of the singly refracting substance of certain ultimate elements in the doubly refracting substance, thus becoming spherical during the act and decreasing in diameter.

PSYCHOLOGY.

DO MONKEYS INVARIABLY LEARN by EXPERIENCE?—Some time ago I read a statement to the effect that monkeys were unable to learn by experience, a particular in which they were said to differ from cats. The experiment suggested was to show the animal its reflection in a mirror, and after a time to repeat the process and observe whether it would be deceived a second time. I have never had the opportunity to try the experiment on monkeys, though I am told, on tolerably good authority, that a monkey can never satisfy itself that there is not another monkey behind the glass. But my acquaintance with cats is somewhat larger, and I find that, after once thoroughly investigating the subject, a cat which has reached an age of discretion takes no further interest in its own reflection. The question in my mind is: if a monkey cannot learn by experience, how can it learn? for it seems to me that almost every means of learning can be reduced to some form of experience, or to something that is practically the same thing.—*W. H. Frost, Brown University.*

A DOG'S STRATEGY.—Our little farm dog "Trip" is of mongrel descent, yet he has more than an ordinary amount of "gray matter" in his brains. He is very sagacious and knowing, and only seems to lack the power of speech to show that sensible ideas run through his head. He likes to leap from a stump into my arms as I am on horseback, and go off with me at a full gallop. One day a lot of pigs got out of their enclosure through a little hole at the apex of an acute angle, or corner, of the fence. This angle widened into the garden where the pigs were not tolerated. As soon as "Trip" saw them he went after them to get them out. They fled before him into this angle and began, slowly, of course, to make their way through. As soon as he saw them all within the angle, he stopped before its widest opening—the base—and intently watching, waited until the last one had crawled back into its proper enclosure. He seemed to understand that if he made a dash at them they would turn around and rush back into the garden. As soon as they were all in he looked up with a proud and pleased expression, as much as to say: "Isn't that a clever piece of strategy?" We all thought it was. But in numberless incidents of a similar nature "Trip" has proved himself to be a dog of excellent sense and judgment—and often of "rare executive ability."—*Charles Aldrich, Webster City, Iowa, July 11, 1885.*

DO THE LOWER ANIMALS SUFFER PAIN?—As bearing on this question so often asked, we may quote the following statements from Romanes' "Jelly-Fish, Star-Fish and Sea-Urchins": Before any rational scruples can arise with regard to the vivisection of a living organism, some reasonable ground must be shown for supposing that the organism, besides being living, is also capable of suffering. But no such reasonable ground can be shown in the case of these low animals. We only know of such capability in any case through the analogy based upon our own experience, and, if we trust to this analogy, we must conclude that the capability in question vanishes long before we come to animals so low in the scale as the jelly-fish or star-fish. For within the limits of our own organism we have direct evidence that the nervous mechanisms, much more highly elaborated than any of those which we are about to consider, are incapable of suffering. Thus, for instance, when the nervous continuity of the spinal cord is interrupted, so that a stimulus applied to the lower extremities is unable to pass upwards to the brain, the feet will be actively drawn away from a source of irritation without the man being conscious of any pain; the lower nervous centers in the spinal cord respond to the stimulation, but they do so without *feeling* the stimulus. In order to feel there must be consciousness, and, so far as our evidence goes, it appears that consciousness only arises when a nerve-center attains to some such degree of complexity and elaboration as is to be met with in the brain. Whether or not there is a dawning consciousness in any nerve-centers considerably lower in the scale of nervous evolution, is a question which we cannot answer; but we may be quite certain that, if such is the case, the consciousness which is present must be of a commensurately dim and unsuffering kind. Consequently, even on this positive aspect of the question, we may be quite sure that by the time we come to the jelly-fish—where the object of the experiments in the first instance was to obtain evidence of the very existence of nerve-tissue—all questions of pain must have vanished. Whatever opinions, therefore, we may severally entertain on the vexed question of vivisection as a whole, and with whatever feelings we may regard the "blind fury" who, in the person of the modern physiologist, "comes with the abhorred shears and slits the thin-spun life," we should be all agreed that in the case of these animals the life is so very thin-spun that any suggestion of abhorrence is on the face of it absurd.

PSYCHICAL RESEARCH.—The Society of Psychical Research held its third general meeting April 24, in London, to hear the address of Professor Balfour Stewart, F. R. S. This society was founded by Professor Barrett, on the 5th of January, 1882, and formally constituted on the 20th of February of the same year with Professor Henry Sidgwick as president. At present the membership is 586. A kindred society has been recently started in America. Since its commencement the society has issued eight parts of proceedings, and in 1884 commenced the publication of a journal. In the autumn of 1884 a report of the Committee on Theosophical Phenomena was issued for private circulation only. A large number of slips has been printed comprising a selection of the evidence collected in the various departments of inquiry. The greatest liberality on the part of members has enabled the society to do a great deal of printing. Professor Stewart says: "To my mind the evidence already adduced is such as to render highly probable the occasional presence amongst us of something which we may call thought-transference, or more generally telepathy; but it is surely our duty as a society to continue to accumulate evidence until the existence of such a power cannot be controverted. We have not been remiss in this respect, and it will be found from the pages of our proceedings that the main strength of our society has been given to prove the existence of telepathy, in the belief that such a fact well established will not only possess an independent value of its own, but will serve as an admirable basis for further operations.

"It is no doubt quite conceivable that after a quantity of evidence on some subject has been collected the result of its discussion should prove that there is nothing in it worth inquiring into, at least nothing new. But a definite settlement even of a negative character is not without its value, and this can only be obtained as the result of an exhaustive discussion. On the other hand it is conceivable that the result of such a discussion may be the establishment of new facts eminently worthy of record, and the next generation of our society would greatly blame the present if we decline to bring together, examine, and register the co-temporaneous evidence, so as to fit it, if not for our own final discussion, at least for that of those who shall come after us."

Part VII contains the following papers:—

On the telepathic explanation of some so-called spiritualistic phenomena, by Frederick W. H. Myers.

Abstract of the president's opening address at the eleventh general meeting.

M. Richet's Recent Researches in Thought Transference, by O. J. Lodge and Alfred Lodge.

The problems of Hypnotism, by Edmund Gurney.

Part VIII contains:—

Automatic writing, by Frederick W. H. Myers.

Opening address at the thirteenth general meeting by Professor Balfour Stewart.

Notes on the evidence collected by the Society for Phantasms of the dead, by Mrs. H. Sidgwick.

Hallucinations, by Edmund Gurney.

The calculus of probabilities applied to psychical research, by F. Y. Edgeworth.

ANTHROPOLOGY.[1]

ANTHROPOLOGICAL PUBLICATIONS.—The Philosophic Grammar of American Languages as set forth by Wilhelm von Humboldt, with the translation of an unpublished memoir by him on the American verb, by Daniel G. Brinton, A.M., M.D., professor of ethnology and archæology at the American Academy of Sciences, Philadelphia. (Read before the American Philosophical Society, March 20, 1885. Philadelphia, McCalla & Stavely, pp. 50.)

The original MS. of the memoirs is in the Royal Library at Berlin, whence Dr. Brinton obtained a copy. The fundamental ideas of the Philosophical Grammar are these: "The diversity of structure in languages is the necessary condition of the evolution of the human mind." Historic grammar traces the forms of a language; comparative grammar extends the investigation over many dialects or languages; philosophic grammar analyzes the inmost nature of languages with reference to thought. It is contrary to the results of study that the monosyllabic, the holophrastic and the inflectional languages were developed one from another.

On some doubtful or intermediate Articulations; an experiment in phonetics, by Horatio Hale, Esq. London, Harrison & Sons., St. Martin's place. 1845, pp. 243. (Reprinted from Journ. Anthrop. Inst., Feb., 1885.) This essay discusses the mixing of sounds of the same character, *m*, *b*, *w*; *d*, *l*, *n*, *r*, and seeks to account for it. Three theories are proposed; careless utterance; slight anatomical modifications in the speaker; failure of the listener to catch intermediate sounds. Mr. Hale in his paper develops the latter view. There is no doubt, as we have shown in another place, that the philologist must take into consideration the ear and the eye of the receiver of language as well as the vocal organs or the pen of the author. Furthermore, it will be found that all unwritten languages are holophrastic by agglutination or by incorporation, and that monosyllabism and inflection are two effects produced by the reduction of languages to writing. In the examples cited by Mr. Hale the difficulties are remedied instantly, when the missionaries invent an alphabetic system.

American Languages and why we should study them, an address delivered before the Pennsylvania Historical Society, March 9, 1885, by Daniel G. Brinton, professor of ethnology and archæology at the Academy of Natural Sciences, Philadelphia. (Reprinted from the *Penn. Mag. of Hist. and Biog.*) Philadelphia, Lippincott, 1885, pp. 23. In this essay the author main-

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[1] Edited by Professor OTIS T. MASON, National Museum, Washington, D. C.